Northwest Fisheries Science Center
YEAR IN REVIEW 2014

NOAA FISHERIES
Northwest Fisheries SCIENCE CENTER

142 scientific papers published

30 days tracking L87, an endangered killer whale

524 days of small boat surveys, including,
13 days in the upper Columbia River,
175 days in Puget Sound,
336 days in the lower Columbia River

250 days at sea on NOAA ships or charter vessels

105 media articles about our science

11 National Research Council post-docs hosted

1,600 adult Redfish Lake sockeye salmon returned to Idaho

2,600+ new energy-saving lights saved us **$24,000**

27 forensic wildlife cases analyzed

95,000+ views of this photo

1 Senior Scientist elected to Washington State Academy of Sciences

54 students mentored by scientists

Pacific Northwest

Published 10 Year Report on Southern Resident Killer Whales
We completed a **comprehensive report** that summarized the last 10 years of research and conservation of Southern Resident Killer Whales, and outlined NOAA's research and management priorities to help with the species' long-term recovery.

Seattle Aquarium Exhibit on "Sound Choices"
Together with the Seattle Aquarium, we developed an exhibit about how our choices shape the future of Puget Sound. The "Sound Choices" exhibit is based on our **ecosystem-based management research,** to identify what makes a healthy ecosystem, understand the risks and benefits of management decisions, and plan for future pressures such as climate change and population growth.

Monitoring Habitat in Puget Sound
We launched the **Puget Sound Habitat Status and Trend monitoring program** for four basic habitat types – nearshore, delta, mainstem, and floodplain habitats. The project will provide valuable status and trend data for 5-year status reviews of federally-listed salmonids in Puget Sound.

Studied Public Perceptions of Environmental Change
Our large-scale **survey of Puget Sound residents** was one of the first to document public perceptions of social and environmental change in the region, and this body of work was highlighted at the 2014 Salish Sea Ecosystem Conference, in the Encyclopedia of Puget Sound, and in the *Journal of Environmental Management.*

Understanding Early Mortality in Steelhead
We provided the first spatial and temporal data on interactions between Puget Sound steelhead and harbor seals by installing **new acoustic telemetry arrays,** implanting transmitters into steelhead smolts, and tracking harbor seals by GPS. The study, part of the collaborative US-Canada Salish Sea Marine Survival Project, identified areas of high mortality for steelhead and specific locations where harbor seal predation appears to be a proximate cause.

Monitoring Habitat in the Columbia River Basin
We oversaw the 4th year of the **Columbia Habitat Monitoring Program**, a precision mapping effort that surveys over 300 sites to help managers recover endangered salmon and steelhead. The data allows biologists to track trends in habitat quality, assess benefits of habitat restoration, and identify changes most likely to benefit fish.

Used Life-Cycle Modeling for Threatened Willamette River Chinook and Steelhead
We used **sophisticated modeling** of salmon life cycles to anticipate effects of reintroducing spring Chinook and steelhead above dams on four tributaries of the Willamette River. The models produced estimates of salmon abundance, productivity, and life-history diversity. Managers will use the outputs to develop cost-benefit analyses to guide future actions.

Nationwide

Opened New Shellfish Hatchery

NOAA and the Puget Sound Restoration Fund are working with state, tribal and industry partners in Washington State to **rebuild populations of native Olympia oysters** in Puget Sound and restore 100 acres of oyster habitat by 2020. We opened the new Kenneth K. Chew Center for Shellfish Research and Restoration and breed native oysters and other Pacific Northwest shellfish.

Installed Mobile Ocean Acidification Treatment Systems (MOATS)

Thirteen MOATS were installed at our Mukilteo Research Station to help study the effects of acidifying waters on shellfish and other marine life. These small units were developed by our ocean acidification team as **low-cost, mobile units** that can be deployed at hatcheries, field stations, or aboard ships.

Operational Support

- We managed **50 grants worth $12M** for federally-funded opportunities in time to avoid gaps or delays in research and obligate funds for the fiscal year.
- We completed a major reorganization by merging two science divisions into one new division, the **Environmental and Fisheries Sciences Division.**
- We completed a multi-year **shoreline restoration project t**o address stormwater pollution at the Montlake laboratory.
- We launched the NOAA West Coast Region's groundfish fisheries permits database and fulfilled the annual renewal process, which helped generate files for **550 permits** that could be easily mailed to permit holders.
- We completed **82 personnel packages** to support continuity of research, manage our workforce, and streamline operations.
- We upgraded the small boat program by hiring **two vessel operations coordinators,** who ensure safe operations and maintenance of the Center's small boats.

Awards

DOC Gold Medal, DOC Bronze Medal, DOC Energy and Environmental Stewardship Award, NOAA Restoration Center Excellence in Restoration Award, NOAA Fisheries' Economics and Social Sciences Best Paper Award, Western Division of American Fisheries Society Award for Excellence, and Honorable Mention for outstanding article in *Marine Resources Economics* journal.

Organized Ocean Modelers to Deliver Information to Managers

We convened the Ocean Modeling Forum to improve the use and **usefulness of models** in the study of coastal and marine ecosystems, and to develop products that specifically benefit managers. The group completed a case study on Pacific sardines, launched a second study on Pacific herring, and began interviewing stakeholders involved in ocean and fisheries management decisions to learn how we can best deploy the OMF model.

Monitored West Coast Waters for Traces of Radiation

We collaborated on a study that found trace (barely detectable) levels of Fukushima reactor radiation in West Coast albacore tuna, which may have carried the contamination across the Pacific during their migration. The **radiation levels in the tuna were well below standards** set for human consumption and below background levels of other radioisotopes.

Bred All-Female Sablefish for Aquaculture

Sablefish ("black cod") is a high-value fishery in the North Pacific and a promising marine aquaculture species. Female sablefish grow about 30% larger than males and all-female production would **dramatically improve the financial prospects** of farming this species. We developed neomale sablefish over the past 4 years, and this year bred them with female broodstock to generate all-female offspring. These monosex sablefish are not genetically modified or treated with hormones.

Advanced Fisheries Ecosystem Plans

We co-chaired the Science Panel of the **Lenfest Fishery Ecosystems Task Force** to outline the components of effective Fisheries Ecosystem Plans. Its goal is for fisheries managers to develop ecosystem plans that are useful for specific management contexts, ecological dynamics, and socio-economic circumstances.

Contributed to special issue of *Conservation Biology* journal

We served as editor for a special section of the journal *Conservation Biology* that included **9 papers on climate change and the Endangered Species Act,** all of which were authored or co-authored by NOAA Fisheries scientists.

Expanded Economic Reports of Groundfish Catch Share Fishery

We expanded the economic reports for our annual catch share program to include annual data from 2009-2012, and comprehensive graphical overviews for each sector: catcher vessels, motherships, catcher-processors, and shore-based processors. The reports provide information about the **economic effects** of the trawl catch share program to fishery managers, participants, and the public.

Expanded Southern California Hook and Line Survey

Our survey team conducted the 11th consecutive Southern California Hook and Line Survey with **expansion into the Cowcod Conservation Area** to explore the potential for using hook and line sampling techniques to monitor populations within restricted conservation areas.

Delivered Oil Toxicity Studies in Support of NRDA Deepwater Horizon Litigation

We delivered key scientific findings to Department of Justice in support of the Deepwater Horizon Natural Resource Damage Assessment litigation. After the historic 2010 oil spill in the Gulf of Mexico, we documented the **effects of field-collected oil on developing hearts** of bluefin tuna, yellowfin tuna, amberjack, and mahi mahi. The effort yielded: 1) the first crude oil toxicity information ever generated for highly migratory species that spawn in the open ocean's upper surface waters; 2) a major conceptual leap forward in our scientific understanding of oil toxicity to the vertebrate heart; and 3) enormous international public awareness of NOAA's scientific assessment response to the largest oil spill in U.S. history.

United NOAA Fisheries' Marine Forensics Groups

Our Forensics group in Seattle merged with the personnel from the NOS Marine Forensics Laboratory in Charleston, SC to become a **single operational unit for forensic science** within the agency. The Marine Forensics group provides scientific analysis in support of NOAA's Office of Law Enforcement.

Studied Biotic Implications of Changing Ocean Temperatures

We studied the "warm blob" in the North Pacific, a persistent mass of exceptionally warm water dominating the Bering Sea, Gulf of Alaska, and an area off Southern California that could cause **reverberations through the marine food web.** Sea surface temperatures measured this summer were as much as 5.4 degrees F higher than average. Oceanographers at our Newport Research Station studied the biotic implications of this mass of warm water during biweekly surveys off the coast.

Predicted Species Shifts Due to Climate Change

We used scaled-down global climate models to understand effects of climate change on 28 fish species in the NE Pacific Ocean. Our models predict that these **fish will shift northward** an average of 30 km per decade as greenhouse gases warm the atmosphere and the ocean surface. Some species may move north into the Gulf of Alaska and Bering Sea, while others may disappear at the southern end of their ranges, especially off OR and CA.

Scientific Review of West Coast Groundfish Stock Assessment Program

As part of an agency-wide effort, we completed a rigorous review of our West Coast groundfish assessment program and peer-review process. The independent panel examined the assessment development and review processes, and related research. The panel commended the **high quality of assessments** and research and made important suggestions.

Seattle, WA

Washington, DC

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